Attachment 2
RETROFIT VERIFICATION APPLICATION OUTLINE

1. Introduction

- 1.1 Manufacturer and product identification
- 1.2 Type of verification being sought
  - 1.2.1 Selection of specific engine family and application
  - 1.2.2 Diesel retrofit system design *(model, catalyst, precious metal loading, size, etc.)*
  - 1.2.3 Claim of emission reduction
- 1.3 Status of Vehicle Code 27156 exemption

2. Diesel Retrofit System Information

- 2.1 General description of the diesel retrofit system
  - 2.1.1 Discussion of principles of operation
  - 2.1.2 Schematics depicting operation
- 2.2 Description of regeneration method
  - 2.2.1 Operating condition requirements for regeneration *(e.g.,exhaust temperature, backpressure limit, etc.)*
  - 2.2.2 Thresholds and control logic integrated into the retrofit system to activate regeneration (if applicable)
  - 2.2.3 Description of backpressure monitor including threshold and control logic (if applicable)
- 2.3 Favorable operating conditions
- 2.4 Unfavorable operating conditions and associated reduction in performance
- 2.5 Identification of failure modes and associated consequences
- 2.6 Fuel requirements and misfueling considerations
- 2.7 Retrofit system installation requirements
- 2.8 Retrofit system maintenance requirements

3. Testing Background

- 3.1 Identification of specific engine family and application for verification
- 3.2 Emission reduction test information
  - 3.2.1 Test facility identification
  - 3.2.2 Test procedure description *(de-greening period, test cycle, etc.)*
  - 3.2.3 Quality assurance and quality control
- 3.3 Durability test information
  - 3.3.1 Test facility/field application identification
  - 3.3.2 Test procedure description *(field or bench, test cycle, etc.)*
  - 3.3.3 Quality assurance and quality control

4. Test Results

- 4.1 Emission reduction test results and comments
- 4.2 Durability test results and comments

5. Discussion

5.1 Compatibility of the diesel retrofit system with the engine
- 5.1.1 Effects of diesel retrofit system on overall engine performance
- 5.1.2 Effect of diesel retrofit system on engine backpressure
- 5.1.3 Additional load on engine *(magnitude, frequency, etc.)*
- 5.1.4 Effect of diesel retrofit system on fuel consumption
- 5.1.5 Engine oil consumption considerations

5.2 Compatibility of the diesel retrofit system with the application
- 5.2.1 Typical temperature profiles, duty cycles and other relevant parameters from field-collected data for the intended application
- 5.2.2 Comparison of operating conditions suitable for the diesel retrofit system with those expected in the application

5.3 Discussion on all potential safety issues *(e.g., uncontrolled regeneration, lack of proper maintenance, extended periods of vehicle idling, etc.)*

6. References

7. Appendices

A. Laboratory test reports *(include raw test data and quality assurance and quality control documentation)*

B. Diesel retrofit system label

C. Owner's manual
- C.1 Installation procedure
- C.2 Maintenance requirements
- C.3 Backpressure monitor instructions (if applicable)
- C.4 Fuel requirements
- C.5 Fuel penalty
- C.6 Durability statement
- C.7 Warranty and liability policy
- C.8 Contact information for waste disposal
- C.9 Contact information for replacement components and maintenance supplies
- C.10 Safety considerations

D. Other supporting documentation